

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-8 (Canceled):

Claim 9 (Currently Amended): A liquid crystal display device,
comprising:
_____a liquid crystal display panel; and
_____a picture signal line driving circuit for supplying a picture signal voltage to the
liquid crystal display panel; the picture signal line driving circuit further comprising:
 a first output circuit for outputting a positive-polarity picture signal voltage,
 a second output circuit for outputting a negative-polarity picture signal voltage,
and
 a switching circuit for switching the positive-polarity picture signal voltage
supplied from the first output circuit and the negative-polarity picture signal voltage
supplied from the second output circuit to a pair of picture signal lines and outputting
the voltages, the switching circuit further including:
 a first switching element connected between the first output
circuit and the first picture signal line of the picture signal line pair,
 a third switching element connected between the first output
circuit and the second picture signal line of the picture signal line pair,
 a second switching element connected between the second
output circuit and the second picture signal line, and

a fourth switching element connected between the second output circuit and the first picture signal line,
wherein a positive-polarity picture signal voltage supplied from the first output circuit is output to the first or second picture signal line by selectively turning on/off the first, second, third, and fourth switching elements,
wherein a negative-polarity picture signal voltage supplied from the second output circuit is output to the second or first picture signal line by selectively turning on/off the first, second, third, and fourth switching elements, and
and wherein the switching elements are constituted by connecting a transistor at an output circuit side to whose gate electrode a control voltage is applied in series with a transistor at a picture signal line side to whose gate electrode a constant bias voltage is applied.

Claim 10 (Currently Amended): The liquid crystal display device according to claim 9, wherein the bias voltage applied to the gate electrode of the transistor at the picture signal line side is different from the bias voltage applied to a well layer provided with a transistor at an output port and a transistor at the picture signal line side.

Claim 11 (Currently Amended): The liquid crystal display device according to claim 9, wherein the transistors at the output circuit side and the picture signal line side of the first and third switching elements are first conducting-type transistors and the transistors at the output port and the picture signal line side of the second and fourth switching elements are second conducting-type transistors, and

the second conducting-type transistors are connected in parallel with the transistors at the output port of the first and third switching elements and the first conducting-type transistors are connected in parallel with the transistors at the output port of the second and fourth switching elements.

Claim 12 (Original): The liquid crystal display device according to claim 9, wherein the potential of the input terminal of the transistor at the output circuit side is equal to the potential applied to the well layer provided with the transistor at the picture signal line side.

Claim 13 (Currently Amended): A liquid crystal display device comprising:
a liquid crystal display panel; and
a picture signal line driving circuit which applies a picture signal voltage to the liquid crystal display panel, the picture signal line driving circuit including a switching circuit;

wherein the switching circuit ~~includes~~ comprises:

a first transistor having an input, an output, and a gate electrode, the gate electrode of the first transistor having a control voltage applied thereto, the control voltage being effective for turning the first transistor on and off, and

a second transistor having an input, an output, and a gate electrode, the gate electrode of the second transistor having a bias voltage applied thereto,

the input of the second transistor being connected to the output of the first transistor so that the first transistor and the second transistor are connected in series,

wherein the following relationship is satisfied in the switching circuit when the first transistor is turned off:

$$|V1-V2| > |V4-V3|$$

where

V1 is a maximum voltage of the output voltage of the first amplifier circuit,

V2 is a minimum voltage of the output voltage of the second amplifier circuit,

V3 is the bias voltage applied to the gate electrode of the second transistor,

and

V4 is a voltage of the input of the first transistor.

Claim 14 (Canceled):

Claim 15 (Currently Amended): A liquid crystal display device
according to claim 13,

wherein the bias voltage applied to the gate electrode of the second transistor is a first bias voltage; and

wherein the first transistor and the second transistor are formed in a well layer having a second bias voltage applied thereto.

Claim 16 (Previously Presented): A liquid crystal display device according to claim 15, wherein the second bias voltage is different from the first bias voltage.

Claim 17 (Currently Amended): A liquid crystal display device according to claim 13,
wherein the switching circuit further ~~includes~~comprises a third transistor connected in parallel with the first transistor;
wherein the first transistor and the second transistor are first conducting-type transistors; and
wherein the third transistor is a second conducting-type transistor.

Claim 18 (Currently Amended): A liquid crystal display device according to claim 13,
wherein the first transistor and the second transistor are formed in a well layer; and
wherein a voltage of the well layer is equal to a voltage of the input of the first transistor.

Claim 19 (Currently Amended): A liquid crystal display device comprising:
a liquid crystal display panel; and
a picture signal line driving circuit which applies a picture signal voltage to the liquid crystal display panel, the picture signal line driving circuit including:

a first input terminal,
a second input terminal,
a common output terminal,
a first switching circuit having an input connected to the first input terminal and
an output connected to the common output terminal, and
a second switching circuit having an input connected to the second input
terminal and an output connected to the common output terminal;
wherein each of the first switching circuit and the second switching circuit
includes:

a first transistor having an input, an output, and a gate electrode,
the gate electrode of the first transistor having a control voltage applied
thereto, the control voltage being effective for turning the first transistor
on and off, and

a second transistor having an input, an output, and a gate
electrode, the gate electrode of the second transistor having a bias
voltage applied thereto,

the input of the first transistor being connected to the input of the
switching circuit,

the input of the second transistor being connected to the output
of the first transistor so that the first transistor and the second transistor
are connected in series, and

the output of the second transistor being connected to the output
of the switching circuit.

Claim 20 (Previously Presented): A liquid crystal display device according to claim 19, wherein the picture signal line driving circuit further includes a first amplifier circuit which applies an output voltage to the first input terminal, and a second amplifier circuit which applies an output voltage to the second input terminal; and wherein the following relationship is satisfied in each of the first switching circuit and the second switching circuit when the first transistor is turned off:

$$|V1-V2| > |V4-V3|$$

where

V1 is a maximum voltage of the output voltage of the first amplifier circuit,
V2 is a minimum voltage of the output voltage of the second amplifier circuit,
V3 is the bias voltage applied to the gate electrode of the second transistor,
and
V4 is a voltage of the input of the first transistor.

Claim 21 (Currently Amended): A liquid crystal display device according to claim 19,
wherein the bias voltage applied to the gate electrode of the second transistor is a first bias voltage; and
wherein the first transistor and the second transistor are formed in a well layer having a second bias voltage applied thereto.

Claim 22 (Previously Presented): A liquid crystal display device
according to claim 21, wherein the second bias voltage is different from the first bias voltage.

Claim 23 (Currently Amended): A liquid crystal display device
according to claim 19,
wherein each of the first switching circuit and the second switching circuit
further includes a third transistor connected in parallel with the first transistor;
wherein, in the first switching circuit, the first transistor and the second
transistor are first conducting-type transistors, and the third transistor is a second
conducting-type transistor; and
wherein, in the second switching circuit, the first transistor and the second
transistor are second conducting-type transistors, and the third transistor is a first
conducting-type transistor.

Claim 24 (Currently Amended): A liquid crystal display device
according to claim 19,
wherein the first transistor and the second transistor are formed in a well
layer; and
wherein a voltage of the well layer is equal to a voltage of the input of the first
transistor.

Claim 25 (Currently Amended): A liquid crystal display device
comprising:

a liquid crystal display panel including a first picture signal line and a second picture signal line; and

a picture signal line driving circuit which applies a picture signal voltage to the liquid crystal display panel, the picture signal line driving circuit including:

a first output circuit which outputs a positive-polarity picture signal voltage,

a second output circuit which outputs a negative-polarity picture signal voltage,

a first switching circuit having an input connected to the first output circuit and an output connected to the first picture signal line,

a second switching circuit having an input connected to the second output circuit and an output connected to the second picture signal line,

a third switching circuit having an input connected to the first output circuit and an output connected to the second picture signal line, and

a fourth switching circuit having an input connected to the second output circuit and an output connected to the first picture signal line;

wherein each of the first switching circuit, the second switching circuit, the third switching circuit, and the fourth switching circuit includes:

a first transistor having an input, an output, and a gate electrode, the gate electrode of the first transistor having a control voltage applied thereto, the control voltage being effective for turning the first transistor on and off,

a second transistor having an input, an output, and a gate electrode, the gate electrode of the second transistor having a bias voltage applied thereto,

the input of the first transistor being connected to the input of the switching circuit,

the input of the second transistor being connected to the output of the first transistor so that the first transistor and the second transistor are connected in series, and

the output of the second transistor being connected to the output of the switching circuit;

wherein the positive-polarity picture signal voltage output from the first output circuit is applied to the first picture signal line and the negative-polarity picture signal voltage output from the second output circuit is applied to the second picture signal line by turning on the first transistor of the first switching circuit and the first transistor of the second switching circuit, and turning off the first transistor of the third switching circuit and the first transistor of the fourth switching circuit; and

wherein the positive-polarity picture signal voltage output from the first output circuit is applied to the second picture signal line and the negative-polarity picture signal voltage output from the second output circuit is applied to the first picture signal line by turning off the first transistor of the first switching circuit and the first transistor of the second switching circuit, and turning on the first transistor of the third switching circuit and the first transistor of the fourth switching circuit.

Claim 26 (Previously Presented): A liquid crystal display device according to claim 25, wherein the following relationship is satisfied in each of the first switching circuit, the second switching circuit, the third switching circuit, and the fourth switching circuit when the first transistor is turned off:

$$|V1-V2| > |V4-V3|$$

where

V1 is a maximum voltage of the output voltage of the first output circuit,

V2 is a minimum voltage of the output voltage of the second output circuit,

V3 is the bias voltage applied to the gate electrode of the second transistor,

and

V4 is a voltage of the input of the first transistor.

Claim 27 (Currently Amended): A liquid crystal display device
according to claim 25,
wherein the bias voltage applied to the gate electrode of the second transistor
is a first bias voltage; and
wherein the first transistor and the second transistor are formed in a well layer
having a second bias voltage applied thereto.

Claim 28 (Previously Presented): A liquid crystal display device
according to claim 27, wherein the second bias voltage is different from the first bias
voltage.

Claim 29 (Currently Amended): A liquid crystal display device
according to claim 25,
wherein each of the first switching circuit, the second switching circuit, the
third switching circuit, and the fourth switching circuit further includes a third
transistor connected in parallel with the first transistor;

wherein, in the first switching circuit and the third switching circuit, the first transistor and the second transistor are first conducting-type transistors, and the third transistor is a second conducting-type transistor; and

wherein, in the second switching circuit and the fourth switching circuit, the first transistor and the second transistor are second conducting-type transistors, and the third transistor is a first conducting-type transistor.

Claim 30 (Currently Amended): A liquid crystal display device
according to claim 25,

wherein the first transistor and the second transistor are formed in a well layer; and

wherein a voltage of the well layer is equal to a voltage of the input of the first transistor.